

Amendments To The Specification:

Please amend the specification on paragraph 15, page 4, lines 17-24 of the application as follows:

[0015] Generally, it has been known that a phenomenon termed "~~copper leaching~~" "copper dissolution" occurs when a Sn--Ag--Cu alloy is coated on the plated Cu circuit layer of a PWB by the hot-air leveling method. The "~~copper leaching~~" "copper dissolution" is a phenomenon that Cu contained in the circuit layer dissolves in the molten alloy thus coated and as a result, the thickness of the circuit layer decreases. In the worst case, the circuit layer is broken or cut due to the "~~copper leaching~~" "copper dissolution" phenomenon. This degrades the reliability of the PWB.

Please amend the specification on paragraph 16, page 5, lines 1-6 of the application as follows:

[0016] It has also been known that the "~~copper leaching~~" "copper dissolution" occurs when a Sn--Ag--Cu alloy is used as a solder for mounting electronic parts or components onto the Cu circuit layer of a PWB by the flow-soldering method. In this case, soldering defects tend to occur due to the "~~copper leaching~~" "copper dissolution" thereby degrading the reliability of the PWB.

Please amend the specification on paragraph 17, page 5, lines 7-14 of the application as follows:

[0017] Accordingly, to effectively prevent the ~~"copper leaching"~~ "copper dissolution" phenomenon, the Japanese Non-Examined Patent Publication No. 11-77368 published in Mar. 23, 1999, discloses a "Pb-free solder alloy" that contains a Sn--Pb--Bi--In alloy as its main ingredient and 1 to 4 wt % of Cu. The Japanese Non-Examined Patent Publication No. 9-94688 published in 1997 discloses a "Pb-free solder alloy" that contains a Sn--Zn--Ni alloy as its main ingredient and 0.1 to 3 wt % of Cu.

Please amend the specification on paragraph 18, page 5, lines 15-24 of the application as follows:

[0018] The solder alloys disclosed in the above-identified Publication Nos. 11-77368 and 9-94688 have an object to prevent the ~~"copper leaching"~~ "copper dissolution" phenomenon by addition of Cu. However, the solder alloy disclosed in the Publication No. 11-77368 has a disadvantage that the melting point is excessively high because its solidus and liquidus temperatures are 208° and 342°, respectively. The solder alloy disclosed in the Publication No. 9-94688 has a disadvantage that it is easily oxidized This is because the solder alloy is one of Sn--Zn alloys having the above-described easy oxidation property.

Please amend the specification on paragraph 19, page 6, lines 11-13 of the application as follows:

[0019] In addition, none of the above-described Publication Nos 2-34295, 2-179388, 4-333391, and 6-269983 refers to the "~~copper leaching~~" "copper dissolution" phenomenon. Similar to the above-described Publication Nos. 11-77368 and 9-94688, the above-described Publication No. 11-77366 discloses the fact that the "~~copper leaching~~" "copper dissolution" phenomenon can be suppressed by addition of Cu. However, the Publication No. 11-77366 does not describe how much the addition of Cu suppresses the same phenomenon.

Please amend the specification on paragraph 20, page 6 lines 11-13 of the application as follows:

[0020] Accordingly, an object of the present invention is to provide a Pb-free solder that has a satisfactory low melting point and that suppresses effectively the "~~copper leaching~~" "copper dissolution" phenomenon.

Please amend the specification on paragraph 31, page 7 lines 10-18 of the application as follows:

[0031] With the Pb-free solder according to the first aspect of the invention, the "~~copper leaching~~" "copper dissolution" phenomenon can be effectively suppressed due to existence of Ni and/or Fe within the specific amount range. Also, since the amount of the Ni and/or Fe is very small, the solder according to the first aspect of the invention has a composition similar to the eutectic composition of Sn--Ag--Cu solders without Ni and Fe. Thus, the solder has a low liquidus temperature (i.e., a low melting point).

Please amend the specification on paragraph 34, page 8 lines 1-4 of the application as follows:

[0034] Preferably, the solder according to the first aspect of the invention has a copper dissolution rate of 0.15 μm or less (or 0.20 μm or less). This is to ensure the suppression of the ~~"copper leaching"~~ "copper dissolution" phenomenon.

Please amend the specification on paragraph 58 page 11 lines 20-24 and page 12 line 1 of the application as follows:

[0058] To accomplish the above-described objects, the inventors conducted experiment and research vigorously and as a result, they found the fact that the ~~"copper leaching"~~ "copper dissolution" phenomenon can be effectively suppressed if proper amount of Ni and/or Fe is/are added to a Sn--Ag--Cu solder alloy. Through the fact thus found, they created the present invention.

Please amend the specification on paragraph 66, page 12, lines 13-18 of the application as follows:

[0066] FIG. 1 and the following Table 1 express the copper dissolution rate ($\mu\text{m}/\text{sec}$) obtained under the condition that specific elements Ag, Cu, Bi, In, Zn, Fe, or Ni were added to Sn as its main ingredient. From FIG. 1 and Table 1, it is seen that the higher the copper dissolution rate is, the more easily the "~~copper leaching~~" "copper dissolution" phenomenon progresses.

Please amend the specification on paragraph 67, page 14, lines 1-9 of the application as follows:

[0067] As seen from FIG. 1 and Table 1, the copper dissolution rate is conspicuously decreased by addition of a trace of Ni or Fe while the decrease in the copper dissolution rate is relatively small when other elements than Ni and Fe are added. Generally, the liquidus temperature decreases with the increasing amount of the added element or elements to an alloy with the eutectic composition. Thus, it can be said that the "~~copper leaching~~" "copper dissolution" phenomenon can be effectively suppressed by addition of Ni and/or Fe while the liquidus temperature is suppressed to rise.

Please amend the specification on paragraph 77, page 17, lines 14-15 of the application as follows:

[0077] Cu is an element having a function of suppressing the "~~copper leaching~~" "copper dissolution" phenomenon of the Cu circuit layers of the PWB.

Please amend the specification on paragraph __, page __, lines __ of the application as follows:

Please amend the specification on paragraph 79, page 18, lines 4-8 of the application as follows:

[0079] As seen from Table 3, the copper dissolution rate decreases with the increasing amount of Cu added, which means that the ~~"copper leaching"~~ "copper dissolution" phenomenon can be suppressed by addition of Cu. It is also found that the liquidus temperature rises as the amount of Cu is increased.

Please amend the specification on paragraph 80, page 18, lines 9-16 and page 19, lines 1-2 of the application as follows:

[0080] From the viewpoint of the tendency from Table 3, with the solder according to the invention, in which Ni and/or Fe is/are added to an Sn--Ag--Cu alloy, the effect to suppress the ~~"copper leaching"~~ "copper dissolution" phenomenon is insufficient when the Cu content is less than 0.4 wt %. On the other hand, when the Cu content is greater than 1.3 wt %, the liquidus temperature is excessively high, causing the possibility that defects tend to occur in the PWB and/or electronic components mounted thereon in the soldering process. Accordingly, it is preferred that the Cu content is in the range from 0.4 wt % to 1.3 wt %, the reason of which is explained later.

Please amend the specification on paragraph 87 page 21, lines 7-10 of the application as follows:

[0087] As described previously, Ni is an element having a function of suppressing the ~~"copper leaching"~~ "copper dissolution" phenomenon of the Cu circuit layers of the PWB. This function becomes distinctive by addition of a trace of Ni.

Please amend the specification on paragraph 88, page 21, lines 11-21 of the application as follows:

[0088] With the Sn--Ag--Cu alloy to which Ni is added according to the invention, when the Ni content is less than 0.02 wt %, the effect to suppress the ~~"copper leaching"~~ "copper dissolution" phenomenon is insufficient. On the other hand, when the Ni content is greater than 0.06 wt %, the liquidus temperature is excessively high, causing a danger that some defect occurs in the PWB and/or electronic components. As a result, the preferred content of Ni is 0.02 to 0.06 wt %, in which the liquidus temperature is set at 240° or lower. It is found that the more preferred content of Ni is 0.02 to 0.04 wt %, in which the liquidus temperature is set at 230° or lower.

Please amend the specification on paragraph 90, page 21, lines 22-23 and page 22, lines 1-2 of the application as follows:

[0090] As described previously, like Ni, Fe is an element having a function of suppressing the ~~"copper leaching"~~ "copper dissolution" phenomenon of the Cu circuit layers of the PWB. This function becomes distinctive by addition of a trace of Fe.

Please amend the specification on paragraph 91, page 22, lines 3-11 of the application as follows:

[0091] With the Sn--Ag--Cu alloy to which Fe is added according to the invention, when the Fe content is less than 0.02 wt %, the effect to suppress the "~~copper leaching~~" "copper dissolution" phenomenon is insufficient. On the other hand, the rise of the liquidus temperature due to the addition of Fe is relatively smaller than that caused by the addition of Ni. In particular, when the Fe content is less than 0.1 wt %, the liquidus temperature scarcely changes due to the addition of Fe. However, if the Fe content is greater than 0.06 or 0.05 wt %, the viscosity is excessively high, causing the following problems.